I-87

CURTAIN WALL
REPUBLIC.

cc: CDB / JRE / W.Bracco / C.Palant

TISHMAN REALTY & CONSTRUCTION CO., INC.

OFFICE CORRESPONDENCE

TO World Trade Center Site File - Curtain Wall DATE March 30, 1966

FROM E. Nadler

SUBJECT World Trade Center - Curtain Wall

A meeting was held on 3/29/66 with Messrs. Booth, Cody, Bruno and Noday of Republic Steel, Mr. S. Coronato of Sparks, and Messrs. Endler and Nadler of Tishman.

The purpose of the meeting was to review Republic's proposed curtain wall scheme, as indicated on their Scheme III drawings and their mockup at Youngstown, Ohio. Most of the outstanding points were as follows:

1. DESIGN:

1. Republic is recommending and is basing their proposal on the use of 18 ga. stainless steel for the column covers. They stated that whenever minor oil canning occurs, it took place on the returns of the columns where it would be practically unnoticeable.

2. On column covers of similar dimensions used on their Research Building, they used 16 ga. stainless steel and had felt that it was too heavy for the purpose.

3. They indicated that they had used both U. S. G. spray-on and Zonolite manufactured by Grace for insulating their mockup columns.

a) The spray-on fireproofing was applied prior to installation of the column covers. They felt that they had been able to maintain a $1\frac{1}{2}$" ± thickness for the mockup. However, they stated that they had no idea how such spray-on could be applied in the field.

b) The Zonolite was poured in a 14 ft. lift. This material which has a density of 57 pcf, set within 10 minutes. The head of material caused some buckling on the returns of the column covers. Also, some weeping of grout occurred at the horizontal joints. This grout was difficult to clean off.

Republic noted that during final clean-up of the mockup, which occurred in freezing weather, the column which had been fireproofed with Zonolite was covered with condensation on the exterior. This phenomenon had not occurred on the columns where a cavity existed between the stainless steel and the fireproofing.

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I-87

WORLD TRADE CENTER
CURTAIN WALL — MARCH 30, 1966

4. REPUBLIC'S DETAILS CALL FOR WELDING BETWEEN THE COLUMN CLIPS AND THE COLUMN COVER STRAPS. THIS WELDING MUST BE DONE BETWEEN THE STAINLESS STEEL, AND THE COLUMN. UNLESS THE STAINLESS STEEL IS CAREFULLY PROTECTED ON THE INTERIOR, WELDING SPARKS MAY CAUSE "BLOOMS" TO APPEAR ON THE FINISHED SIDE.

5. CONSIDERABLE DISCUSSION TOOK PLACE ON THE FACT THAT THE CLEARANCE BETWEEN THE COLUMN COVERS AND THE COLUMN RETURNS WAS EXTREMELY CLOSE IN THE PRESENT DESIGN.

6. CONSIDERABLE DISCUSSION TOOK PLACE ON HOW WATER MAY FIND ITS WAY INTO THE BUILDING. MR. NODAY NOTED THAT THE WALL HAD BEEN DESIGNED FOR A STATIC LOAD OF 50 PSF WHICH IS EQUAL TO A WATER HEAD OF BETTER THAN 10 INCHES. HE STATED THAT THIS WAS THE REASON FOR THE 11 INCH LAP AT THE COLUMN COVERS. HE WAS UNABLE TO EXPLAIN, HOWEVER, HOW SUCH A HEAD WOULD PREVENT LEAKAGE AT THE WEEPS AT THE BOTTOM OF THE SPANDREL PANELS.

7. MR. NODAY FELT THAT THE 50 PSF DESIGN CRITERIA COULD BE OVERCOME IF THE CAVITY BETWEEN THE CURTAIN WALL, THE SPANDRELS AND THE COLUMNS COULD BE ENCLOSED AT EACH FLOOR AND FROM COLUMN TO COLUMN. HE INDICATED THAT HE HAD ATTEMPTED TO CREATE SUCH ENCLOSED POCKETS, AND THAT IT TOOK LESS THAN 3 SECONDS FOR THE PRESSURE TO EQUALIZE BETWEEN THE OUTSIDE OF THE WALL AND THE CAVITY. HE FELT, HOWEVER, THAT FURTHER TESTING MIGHT REVEAL THIS TO BE FEASIBLE, AND IN THAT CASE THE LAP BETWEEN COLUMN COVERS COULD BE REDUCED TO 4 INCHES.

8. THE REPUBLIC DESIGN HAS FEW PROVISIONS FOR THE WEEPING OF CONDENSATION TO THE OUTSIDE OF THE BUILDING. IT WAS FELT THAT THIS SHOULD BE GIVEN FURTHER STUDY.

9. REPUBLIC INDICATED THAT THEY WERE CONTEMPLATING A 16 GA. PORCELANIZED STEEL PANEL AT SPANDRELS. THIS PANEL WOULD BE INSULATED EITHER WITH GLUED-ON FOAM GLASS OR POSSIBLY WITH POLYURETHANE. THEY DID NOT FEEL THAT THIS PANEL WOULD HAVE ANY OIL-CANNING, STATING THAT 16 GA. PANELS OF SIMILAR SIZE HAD PREVIOUSLY BEEN PRODUCED SUCCESSFULLY. REPUBLIC FELT THAT THE COST OF A LAMINATED SANDWICH PANEL OF THINNER GAUGE WOULD BE GREATER THAN THE ONE PRESENTLY PROPOSED.

I-87

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CURTAIN WALL — MARCH 30, 1966

II. ERECTION:

1. REPUBLIC INDICATED THAT THE ERECTION SEQUENCE WOULD BE:

   1 - COLUMN COVERS
   2 - SPANDREL PANELS
   3 - GLASS PRE-ASSEMBLED WITH GASKET
   4 - APPLICATION OF SNAP ON BEADS

2. MR. ENDLER INDICATED THAT FOR DISCUSSION PURPOSES, IT SHOULD BE ASSUMED THAT INSULATION WOULD FOLLOW CURTAIN WALL INSTALLATION.

3. MR. CORONATO INDICATED THAT THE COLUMN CLIPS WOULD BE FIELD APPLIED. HE ALSO INDICATED THAT HE WOULD WANT TO START ERECTION 10 FLOORS BELOW STEEL AND WOULD WANT TO MAINTAIN A MINIMUM OF 5 FLOORS BETWEEN ANY WELDING OPERATION AND ANY SUBSEQUENT ERECTION. CONSEQUENTLY, HE WOULD NEED 5 FLOORS BETWEEN WELDING AND CLIPS AND ERECTION OF COLUMN COVERS AND 5 FLOORS BETWEEN INSTALLATION OF COLUMN COVERS AND GLASS INSTALLATION.

CLIPS WELDED ON GND

4. MR. CORONATO STATED THAT HE FELT HE COULD START ERECTION AT THE RATE OF APPROXIMATELY 2 FLOORS PER WEEK AND REACH A PACE OF 2½ FLOORS PER WEEK.

5. MR. CORONATO INDICATED THAT HE INTENDED TO SET THE CURTAIN WALL ENTIRELY FROM THE FLOORS AND THEREFORE DESIRED THAT THE UNIT WEIGHTS NOT EXCEED 12 FT. FOR THE ABOVE REASON, HE FELT THAT 2 OR 3 FLOOR HIGH UNITS WOULD BE UNWIELDY. MR. CORONATO STATED THAT HE WOULD USE A FORCE OF APPROXIMATELY 90 MEN PER BUILDING OF WHICH 20 TO 32 WOULD BE WELDERS. HE STATED THAT HE WOULD REFINE HIS FIGURES AND FORWARD THESE FOR OUR USE. SPARKS IS CONTEMPLATING THE USE OF INSIDE HOISTS WITH ABSOLUTELY NO HOISTING OR SCAFFOLDING ON THE FACE OF THE BUILDINGS. HE ALSO STATED THAT SPARKS INTENDED TO USE THE BUILDING'S MAN-HOISTS. SOME DISCUSSION OCCURRED ON THE USE OF OFF-HOUR CREWS FOR UNLOADING, HOISTING AND DISTRIBUTING

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